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50 A YEAR

November 4, 1961

VOL. 80, NO. 19

PAGES 297-313

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Precision Reflector

See Page 303

A SCIENCE PUBLICATION

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Kodak reports on:

weakness in bees' knees... new personal monitoring film, very sensitive... Ektaline, sweet Ektaline

Easy honey

Bees flee from the vapor of *Propionic Anhydride* (Eastman P1291) to sheltered parts of the hive. There they cower timorously and submit to robbery. Neither bee nor honey nor thief is in any wise damaged, finds the USDA Agricultural Research Service.

Distillation Products Industries, Rochester 3, N. Y. (Division of Eastman Kodak Company) supplies a kilogram for \$2.55; also a copy of "List No. 42" to facilitate quick action upon receipt of intelligence concerning any other of some 3900 Eastman Organic Chemicals.

Down with the administrative dose

Two little packets of film are extracted from a factory-fresh carton. One is locked away in a clean safe. The other is worn by a worker in the vicinity of ionizing radiation. After a month the two are processed together. Both turn out equally blank. A good dosimeter discloses no difference in their optical densities. What can be inferred about the quantity of ionizing radiation the worker has absorbed?

Anybody who draws the obvious conclusion has failed fully to engage his brain cells in thought. The answer to the question depends on the sensitivity of the film. Once that is known, one can say how much of a dose the worker has probably had less than.

Social ethics in advanced countries require the assumption that the worker has actually had that much radiation. This is known as the "administrative" dose. Records are kept as in a bank. When administrative and physical doses add up to a critical figure, the worker is shifted to a different job. He may habitually spend every Saturday night cruising the center line of a busy highway at 80 m.p.h. Nevertheless, the critical figure assumes that he wants to live forever and become the progenitor of an infinite line of biologically perfect descendants. Pressure to squeeze it down will never let up, we hope.

Without relaxation of solicitude, we have taken steps to cut down the waste of his job experience. By reducing the administrative dose (which is the only kind of radiation dose he really ought ever to get on the job), we can keep him in his slot longer. It is within our power. All we have to do is make more sensitive film. This we have now done.

It is called *Kodak Personal Monitoring Film, Type 3*.

The packet it comes in also includes a piece of low-sensitivity film. Its sensitivity is so low that it can measure 1800 roentgens, a horrible thought. The lower limit of dose measurement for the high-sensitivity film in the packet runs somewhere below 10 milliroentgens. The vague phrasing of that statement doesn't mean that the exact value is unimportant. The main point of this discussion is the importance of the figure. It's just that its precise determination depends on such a complexity of factors that we won't try to explain it here.

If interested, prepare yourself by studying pp. 10-53 to 10-75 of *Radiation Hygiene Handbook* (McGraw-Hill Book Company, Inc., 1959). Then bring your knowledge up to date by requesting a data sheet on *Kodak Personal Monitoring Film, Type 3* from Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y. Be impressed with the fact that the boys who built this film have just finished measuring the dose to which a recent Discoverer satellite exposed itself in its travels. It's no administrative dose.

THIS paper

"My husband sells oscillograph paper. Competition is fierce. He comes home beat every night."

Few overhearing her would know what the poor soul is talking about, yet she speaks the truth. With research and development activity now constituting such a respectable fraction of the Gross National Product, oscillographs probably outnumber pickle barrels in this country at the present time. Oscillographers are correspondingly numerous. Methods that one sect of oscil-

lographers prefers above all else another sect can't see for dirt. One sect prefers automatic oscillogram processors. Paper manufacturers like us find their favor worth competing for. Therefore we announce a new advance in media for their use.

An advance in the old art of paper-making came first. Then new emulsions were devised to work properly with the new base. Then proper processing chemicals were devised for the new emulsions. Then the combination was extensively proved out under practical conditions of use by parties interested only in end results and hardly at all in the how and why. They found that

1. THIS paper dries thoroughly at high processor speeds without creases. 180 in./min. is not too fast.
2. THIS paper gives trace lines that stand out as black as the ace of spades. Background is nice and clean.
3. THIS paper isn't fussy about how long it sits around before use. O.K. to keep plenty on hand.
4. THIS paper is rugged. No cracking, no crumbling.
5. THIS paper holds its dimensions. Justifies careful measurement.

"THIS" won't do for a trademark. (The code name for the field trials was "Kind 1534.") Let's call it Kodak Ektaline Paper. It comes in the two usual speeds for oscillographs, Kodak Ektaline 16 Paper and Kodak Ektaline 18 Paper. Kodak Ektaline Chemicals come as liquids. The stabilization principle used in the automatic oscillogram processors came from Kodak, too. An inquiry to Eastman Kodak Company, Photorecording Methods Division, Rochester 4, N. Y., puts everything in place right up to the moment.

Price subject to change without notice.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

Kodak
TRADE MARK

MEDICINE

Tell Cancer Victims Truth

Leading cancer authorities agree a cancer patient should be told the truth about his disease. Watson Davis reports results of a Science Service poll of experts.

► LEADING CANCER authorities agree that a cancer patient should be told his diagnosis and the expectation of the course of his disease.

In a telegraphic poll by SCIENCE SERVICE of the experts assembled in the scientific sessions of the American Cancer Society in New York, Oct. 23 and 24, nearly all who answered believed that doctors should tell the diagnosis with due care for the person's situation and condition. As to what should be told about prognosis, the prospects for the future, there was emphasis on being hopeful but honest. The possibility of new and better methods of treatment should not be overlooked.

The way to tell a patient about his condition was repeatedly stressed as important.

Dr. Alton Ochsner of the Ochsner Foundation Clinic, New Orleans, in expressing the belief that with few exceptions patients should be told, stressed the manner of telling.

Expressing the belief that cancer patients should know the diagnosis with only rare exceptions, Dr. Thomas Carlile of The Mason Clinic and Virginia Mason Hospital, Seattle, Wash., said further:

"Because of so many variables in the response to treatment and natural course of disease, the cancer patient should not be deprived of the hope of improvement or cure and a continued utilization of available methods of treatment should be made.

"As to prognosis, some patients must know statistical averages and opinion or estimate of his physician for business or other reasons. However, in most instances, it is to everyone's advantage to assume how any individual patient will follow the most favorable course of a particular tumor situation and for the patient, the family and the physician to act accordingly, as a time will come when even better methods of treatment will be available."

Dr. John G. Walsh of the American Academy of General Practice, Sacramento, Calif., stated:

"Since cancer may be serious in varying grades depending upon the type and location, total and complete details of a prognosis cannot always be given by doctors. Many types of cancer have good prognosis relative to a cure. To withhold knowledge of the diagnosis of cancer and at least a reasonable explanation of prognosis from a patient requesting information is not in the best interest of a patient from the spiritual, emotional and moral standpoint. This is true especially if a rapid downhill course may result in leaving a family unprepared for disaster.

"From a financial, emotional and legal basis, the personal physician, usually the

family doctor, should know the patient well enough to select those who prefer not to know the cold facts relative to a poor prognosis. Many of these cases already know or sense the future, but shelter themselves from the truth until they actually know the end is near. To destroy this natural protective mechanism might prematurely create a severe emotional state. Most patients wish to know the diagnosis and prognosis, at least in a general way. It is more difficult to screen those who do not, and to understand their reasons."

All patients are individuals with feeling, with varying degrees of intelligence and emotional stability, and with malignant diseases of varying prognosis. Dr. Samuel G. Taylor, III, of the University of Illinois, Chicago, commented. For these reasons Dr. Taylor believes the decision as to whether a patient should be told must always be made on an individual basis by a physician who has been able to measure intelligently all these factors.

Explaining that at the University of Minnesota hospitals, most patients seen are aware of the nature of their illness, whether cancer or other diseases, Dr. Victor Gilbertsen, University of Minnesota Medical School,

Minneapolis, said that most of those who had not been informed by their physicians found out for themselves or were told by friends or relatives. Dr. Gilbertsen believes that "nearly all patients should be informed of the nature of their illness, if they are told in an unemotional, realistic, and understanding manner. Patients aware of their diagnosis report that such information has been of definite value regarding cooperation in planning of further medical care, in alleviating anxiety, and in planning for the future of their families."

Dr. Eugene P. Pendergrass, University of Pennsylvania School of Medicine, Philadelphia, Pa., has found that an explanation as to the nature of the patient's disease takes time, but it is very effective in gaining his confidence and that often the patient may be told the truth about the diagnosis if one takes adequate time to prepare him for such an interview and uses good common sense.

In the experience of Dr. I. Rossman, Montefiore Hospital, New York City, most cancer patients become aware of the diagnosis and do not press for discussion of it. When the question is raised, he said, it should be handled delicately but not evasively. Prognosis is always difficult to discuss concretely and, in his opinion, is better left somewhat vague, since some patients greatly outlive the most expert guesses.

Dr. Richard L. Evans, Salt Lake City, Utah, advises that the physician should always be hopeful and that personal circumstances should determine the degree of disclosure.

In the opinion of Dr. J. Englebert Dunphy, University of Oregon Medical School, Portland, Ore., patients should definitely be told about diagnosis and prognosis.

Dr. George G. Reader, New York Hospital, Cornell Medical Center, New York City, feels that most patients need not be told because diagnosis and prognosis become matters of implicit understanding between patient and physician.

To Dr. Eugene M. Bricker, Washington University, St. Louis, Mo., there is no fixed inflexible rule because whether or not cancer patients are told the truth depends on individual circumstances.

Commenting as associate professor of health and religion at the University of Chicago, Chicago, Ill., Dr. Granger E. Westberg said:

"There is a growing feeling among clergymen that a cancer patient has a right to know the truth about his condition. Religion has always confronted man with the fact that he does not live on this earth forever. If a clergyman is asked by the family or the doctor never to mention death to the patient, then an insipid ministry results. The clergyman rebels against such dishonesty.

"Cancer patients cannot put their trust in a clergyman who is forced by relatives to talk only about the weather. The purpose of true faith is so to relate a person to God that he is not overcome by the threat of death. Not to speak of it honestly is to treat the patient as a thing and not as a person."

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BRAIN SHOTS—The Magnascanner draws a line-by-line picture of the brain or other body organs after a small amount of radioactive material is introduced. Primarily used for diagnosis of cancer, the instrument, produced by the Picker X-Ray Corporation, White Plains, N. Y., was shown at the Second International Congress of Neurological Surgery.

SURGERY

Relieves Unbearable Pain

► **SURGICAL RELIEF** of unbearable pain in cancer, neuralgia and other conditions that do not respond to medication was reported at the second International Congress of Neurological Surgery in Washington, D.C. Precise surgery also was shown to correct the tremors of shaking palsy (Parkinson's disease) and to stop the jerks of epilepsy.

A more refined technique of precisely locating the area causing the violent jerks of epilepsy was reported in a laboratory film and an interview with Prof. Marcel David of St. Anne's Hospital, Paris, France. Prof. David described the meticulous form of surgery (stereotaxy) performed in selective brain areas that are destroyed in order to enable patients to lead more normal lives.

In the famous operating room at St. Anne's neurosurgeons from all over the world watch the procedures. A whole series of electrodes are introduced and the exact point is found for destruction. A tiny pellet of yttrium (radioactive metal) is then introduced to destroy an area of two millimeters in size.

Dr. James C. White, emeritus professor of surgery at Harvard University and from the neurosurgical laboratories at the Massachusetts General Hospital, reported on work done with an electrical current used to relieve the pain of patients with incurable cancer without causing major psychological damage.

The old method of lobotomy destroyed

much of the brain, but when used on mental patients the problem was not as severe as in normal minds. The ensuing deterioration in personality among normal persons has made the operation unpopular until now.

• Science News Letter, 80:300 November 4, 1961

Radioisotopes Used

Diagnostic and therapeutic uses of radioisotopes were discussed at the International Congress of Neurological Surgery in Washington. Advantages of early detection and accuracy in determining locations of lesions were stressed by Dr. Therese Planiol of Paris, France, who reported on studies with 1,800 patients following experimental work with animals.

Dr. Jean Talairach, also of Paris, said the use of radioactive isotopes had been successful in treating cerebral tumors as well as "functional neurosurgery." Radioactive gold or the metal yttrium was implanted in tissue that was to be destroyed.

In the opening discussion Dr. Cornelius A. Tobias of the Donner Laboratory, University of California, Berkeley, told of pituitary gland irradiation for advanced cases of cancer, for diabetes with vascular disease and for acromegaly (a disease in which excess secretion of growth hormone is caused by the pituitary gland).

• Science News Letter, 80:300 November 4, 1961

MEDICINE

Treating Incurables

► **THE AGE-OLD PROBLEM** of whether a doctor should let a dying patient pass away instead of prolonging his life with treatment is a legal rather than a medical responsibility, a doctor at the Sloan-Kettering Institute for Cancer Research, New York, said.

"The doctor's job is to keep a patient alive as long as he can," Dr. David A. Karnofsky told the American Cancer Society's scientific session.

Dr. Karnofsky said that not only do patients expect to be treated as long as they can respond to treatment, but the doctor himself can learn a great deal that will be of value to other patients.

When patients and their families object to further treatment in advanced cases of cancer they should no longer use the hospital's facilities, the speaker said.

"A hospital is a place where active treatment is given, and not a custodial institution," he added. "Patients should be transferred to nursing homes if treatment is not to be continued."

Many communities, however, face a real problem in not having adequate facilities to care for incurable patients as well as those who could be cured. In such cases,

Dr. Karnofsky said, they should develop better facilities, not turn the dying patients out without further treatment.

Asked by SCIENCE SERVICE if experimental treatment should be used on a dying patient by a physician who would not use such radical therapy on one who had a chance to recover, Dr. Karnofsky said "only if the patient requests it and the doctor is qualified."

"I believe it is wrong to experiment unless the experiment serves a useful purpose," he said.

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MEDICINE

TB Drug Has Been Found To Prevent the Disease

► **A TUBERCULOSIS** drug widely used to treat the disease has been found 80% effective in preventing it.

The drug, isoniazid, was used on 12,000 persons who were in constant contact with newly discovered TB cases, Dr. Luther L. Terry, Surgeon General of the U. S. Public Health Service, reported.

Daily doses of isoniazid were taken by

the subjects under medical supervision during a period when the risk of getting the disease is normally very high. It is not known, however, if the protection from the drug will last. The people studied will be observed for several years to see whether or not the protection continues.

The Health Service also found that of each 1,000 persons contacted in connection with new TB cases, 19 examined had the disease. This rate is about 30 times as high as that found by X-ray surveys and shows the value of examining those in contact with newly discovered TB cases.

• Science News Letter, 80:300 November 4, 1961

SCIENCE NEWS LETTER

VOL. 80 NOVEMBER 4, 1961 NO. 19

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., NOnH 7-2255. Cable Address: SCIENSERV.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is addressed. Your new address should include postal zone number if you have one.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member of Audit Bureau of Circulation.

SCIENCE SERVICE

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ARCHAEOLOGY

Unearth Lydian Treasures

► THE GOLDEN TOMBS of Lydia—land of fabled King Croesus reputedly the richest of all men—may be uncovered next year with the help of geophysicists.

Equipment for measuring the electrical resistance in the soil is now being improved to help tell archaeologists where to dig and how deep. This could make it possible to find directly the tunnels that lead to small untouched burial chambers without digging out the entire mounds.

This would save both time and money for the Harvard-Cornell expedition that has just finished its fourth summer of excavations at Sardis, Turkey, which was once the center of ancient Lydia. The team consists of 30 scientists and some 200 workers under the direction of Prof. George M. A. Hanfmann of Harvard University and Prof. A. Henry Detweiler of Cornell University.

During the past summer, geophysicist Dr. David Greenewalt of Massachusetts Institute of Technology, Cambridge, Mass., tested resistivity equipment to see if it could effectively lead archaeologists to buried objects. This type of equipment was tested experimentally earlier in Italy and Central America.

Dr. Greenewalt found that the electrical resistance of the surveyed area increases when objects buried in the ground are of different consistency than the surrounding soil. For example, a stone monument could be detected if buried in soil and sand. A mud-brick wall from an ancient building, however, would not show any appreciable difference from the surrounding soil because it would have about the same electrical conductivity.

He also found that the soil has to be fairly uniform to get good results. If areas of gravel or stone are mixed in the soil, the equipment will register a "noise" similar to interference on television.

MIT told SCIENCE SERVICE that Dr. Greenewalt is hopeful he can improve the equipment to make it useful to archaeologists when they begin excavating the large burial mounds about five miles north of Sardis next summer. Each mound is 400 to 500 feet high. Some have been robbed but many are still intact from ancient times and could yield invaluable information about the lives of the people who lived in this metropolis, the Paris of the ancient world for nearly 3,000 years.

This past summer the Harvard-Cornell

expedition uncovered one tomb of a Lydian lady who lived during the time of King Croesus' father, about 600 B.C. Gold jewelry, a silver figurine and pottery were found in the grave.

A whole street about 50 feet wide was uncovered by the busy team this year. Marble pavements and sidewalks and mosaic colonnades were found on this ancient business street. A portrait head, portraying an unknown sage or saint, was probably part of a statue in the colonnade before Persian invaders destroyed it after 600 A.D.

Dr. Hanfmann told SCIENCE SERVICE that excavations are now planned to continue at Sardis until 1968. By that time the team should have obtained enough data to have a general plan of the city and to establish the sequence of major historical phases. Evidence dating back to the earliest agricultural settlements in the area should also be established by that time.

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ANTHROPOLOGY

Neanderthal Re-evaluated

► ANCIENT NEANDERTHAL man, long believed an apelike creature from a dead branch on man's family tree, could turn out to be an ancestor of modern man.

Dr. T. Dale Stewart, head curator of the department of anthropology at the Smithsonian Institution, told SCIENCE SERVICE that the Skhul people found in Skhul Cave in Mount Carmel, Palestine (now Israel), could have evolved into a modern man during the time gap between 50,000 years ago when Neanderthals disappeared and 35,000 years ago when modern man appeared.

Dr. Stewart said Neanderthals, when first discovered, were pictured as much more primitive than they actually were. He said these primitive men were not too much different from modern man.

According to Dr. Stewart, Neanderthals fall into two populations:

1. The primitive type who has been found in Shanidar Cave in Iraq, Tabun Cave at Mt. Carmel, and in Europe. He is believed to have died out as he became increasingly primitive.

2. A more modern type such as the Neanderthals from Skhul Cave who probably lived about the same time as the Shanidar man, 45,000 to 60,000 years ago or earlier. This type could have evolved into a modern man.

Apparently the two types lived at the same time; the primitive type is most often associated with the idea of Neanderthals, having practically no forehead and very large eyebrow ridges.

Dr. Stewart said that so far as is now known no Neanderthals lived later than 45,000 years ago. The exaggerated features now associated with Neanderthals were mainly found in the sidelines of the primitive types while the evolutionary main-streams of these men were more in the direction of modern man.

Neanderthals have been credited by some anthropologists with the invention of sewing, and the first known evidence of surgery was found in a Neanderthal whose arm had been amputated.

The first suggestion of man's humanity to man was seen in this same individual who had been allowed to grow up and live for some 30 years despite the fact that it was necessary to protect and wait on him.

Dr. Stewart reported on the evidence of human evolution and the evolution of modern man from Neanderthals at the Washington Academy of Sciences.

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ANCIENT HEAD STUDIED—Prof. George M. A. Hanfmann, field director of the Harvard-Cornell Expedition to Sardis, Turkey, studies a portrait-head recovered from the debris over the main road of Sardis.

PUBLIC HEALTH

Food-Borne Disease

► IN SPITE of the high standards of sanitation in the United States, food-borne and water-borne diseases are still common.

In the ten-year period ended in 1960, about 2,300 outbreaks were reported, which included almost 100,000 recorded cases. It is estimated conservatively, however, that unreported cases would raise the total as much as 20 times.

Dr. Carl C. Dauer, medical adviser at the U.S. Public Health Service's National Center for Health Statistics, reports in Public Health Reports, 76:915, 1961, that there is good reason to believe that food-borne, and to a lesser extent, water-borne diseases are still widely prevalent in this country.

Among four outbreaks of typhoid fever reported in 1960, Dr. Dauer said, were cases traced to a well contaminated by a septic tank. Infectious hepatitis outbreaks also were reported among school children who drank water from wells contaminated with sewage.

Custard-filled desserts, salad, poultry and meats accounted for hundreds of cases of food poisoning last year. A family outbreak of ten cases was caused by eating home-made ice cream containing raw milk and a cracked egg. Poultry or other meat accounted for more than half of the 1960 outbreaks.

A large outbreak with 954 cases of a type of streptococcus infection occurred on a military installation where a cook had a sore throat and had left unrefrigerated giblet gravy overnight.

MEDICINE

Artificial Heart Valve

► A PREVIOUSLY HOPELESS condition of the heart—a defective heart valve—can now be corrected by successful surgery, it was reported at the American Heart Association meeting in Miami Beach, Fla.

Many of the 500 gravely ill patients described by three teams of surgeons who did partial or total replacements of the aortic valve (located at the root of the aorta, the body's main artery) are still living, 10 to 18 months following surgery.

One of the teams reporting was made up of Drs. Charles A. Hufnagel and Peter W. Conrad of Georgetown University Medical Center, Washington, D.C.

Rheumatic heart disease accounted for most aortic insufficiency cases reported by the doctors.

A heart-lung machine was used in all the operations described, so that blood could be detoured from the heart, permitting the surgeon to work on a relatively dry and motionless organ. The heart was cooled to 50 degrees Fahrenheit to expose the valve safely for operation.

Another key factor reported was the development of synthetic materials such as Teflon, which can safely be implanted

Two families were felled by mushroom poisoning and one family became ill from eating portions of the tree tobacco plant, *Nicotiana glauca*, that had been mistaken for wild "greens."

Dr. Dauer discounts reports indicating that England and Wales have more food-borne and water-borne diseases than the U.S., although not one of the states in this country had an average annual rate equal to that reported in England and Wales as a whole during the past ten years, he points out.

"A more effective system of collecting information in England and Wales probably accounts for much of this wide difference," Dr. Dauer said.

It also cannot be assumed that states which reported the greater number of outbreaks had inferior sanitary conditions, Dr. Dauer points out. They probably encouraged a higher degree of reporting.

California, for example, reported 826 outbreaks in the ten-year period, whereas New York reported only 336 outbreaks. Many cities do not report local outbreaks to state health departments, and many family outbreaks never come to the attention of local authorities.

Dr. Dauer told SCIENCE SERVICE that although few fatalities could be estimated from food-borne and water-borne diseases, their widespread occurrence gives them a place of continued importance in the country's public health problems.

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within the body and which resists the formation of blood clots. The prosthetic devices with tough but flexible synthetics make good substitutes for the natural heart valve.

It was Dr. Hufnagel who first developed a "trapped ball" valve that he used in 1952 to prevent blood from backing up into the heart from the aorta through a defective aortic valve.

Since then, newer methods offer the possibility of total correction of the condition. Dr. Hufnagel's 1952 technique meant inserting the valve in the aorta at some distance from the heart.

Successful operations also were reported by Drs. J. W. Kirklin, F. H. Ellis and Dwight C. McGoon of the Mayo Clinic, Rochester, Minn., and by Drs. William H. Muller Jr., James B. Littlefield and J. Francis Dammann Jr., all of the University of Virginia, Charlottesville.

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Can Still Bear Children

► THE WOMAN who was born a "blue baby," the result of oxygen deficiency in

the blood, or who has some other congenital heart disease can still bear children in two out of three pregnancies.

Miscarriages and other pregnancy hazards are more likely among women with inborn heart defects, a Baltimore woman doctor told the American Heart Association meeting in Miami Beach, Fla., but a large percent have normal children.

Dr. Catherine A. Neill of Johns Hopkins Hospital reported the study, which was made with the help of Sheila Swanson. They surveyed former patients of the Harriet Lane Home Cardiac Clinic of Johns Hopkins Hospital, where the first "blue baby" operation was performed in 1945.

Dr. Neill said that 82 patients (or 167 of the total pregnancies) were in this blue baby group, and about three out of four had been operated on in the past.

In another report, Dr. Sidney Blumenthal, speaking for a team of physicians from Columbia University-Presbyterian Medical Center, New York, said a high proportion of babies dying during their first year of life from inborn heart defects could be saved.

In a study of 500 cases, Dr. Blumenthal reported that deaths from congenital heart disease are higher during the first year of life than at any comparable period. If an "aggressive approach" is taken toward diagnosis and treatment, he said, surgery can prevent many of these deaths.

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MEDICINE

Blood Test Tells Types of Arthritis

► THE DIFFERENCE between rheumatoid arthritis and psoriatic arthritis may be distinguished by a new blood test analysis of serum proteins.

The procedure was developed in a co-operative study involving the Medical School of the University of California, Los Angeles, the University of Southern California and the Veterans Administration Hospital in Long Beach. Drs. Charles L. Heiskell, Charles M. Carpenter, Henry E. Weimer, William B. Reed and William Becker conducted the study.

It was found that protein patterns in blood serum from patients with rheumatoid arthritis differed significantly from those with psoriatic arthritis. Thus, the laboratory procedure may be useful in distinguishing the two forms of arthritic disease.

The clinical importance of this observation is that the two types of arthritis may require different types of treatment.

The study also indicated that measurements of these serum proteins may also be useful in following the response to treatment of rheumatoid arthritis. There was, however, no significant relation between such measurements and the severity and duration of psoriasis.

It is hoped that such studies may give a clue to the causes of psoriasis and rheumatoid arthritis, which are unknown. So far, there is no indication of why levels of serum proteins change as these diseases progress.

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SPACE

Tiny Dipoles Seen Safe

See Front Cover

► **EVEN IF** the 350,000,000 tiny, hair-like "satellites" just launched do not spread out into an even band around the earth, no bad effects are anticipated.

The copper "hairs" were launched piggy-back on the U.S. Midas IV satellite in an attempt to find out if they could be used for global radio communications. The hairs, or dipoles, are expected to spread out 2,100 miles above the earth into a band five miles wide and 25 miles thick in 30 to 60 days.

If they scatter as scheduled, the dipoles will not interfere with observations of the sky by either radio or light, visible or ultraviolet, nor be an added hazard to manned space travel, a panel of experts, including seven top scientists, decided under approval of Dr. Jerome B. Wiesner, President Kennedy's science adviser.

Scientists, including some from Europe and Russia, have objected that these dipoles might interfere with astronomical observations, both optical and by radio. However,

Massachusetts Institute of Technology's Lincoln Laboratory, Lexington, Mass., in charge of the project, reported to SCIENCE SERVICE in an interview that even if the dipoles bunched together they would not interfere with observations because of the smaller area covered.

The Lincoln Laboratory reported that radio signals at the very high frequency of 8,000 megacycles would be bounced off the dipoles. This high frequency was chosen because it would not interfere with other satellite equipment, or ordinary radio broadcasting signals that are from 600 kilocycles to about one and a half megacycles. TV operates on higher frequencies up to about 900 megacycles.

Returns from the band will be very weak because there will be 1,200 feet between each dipole and only 90 in each cubic mile of air. Each of the dipoles is three-quarters of an inch long, one-third the thickness of a human hair, and one is scarcely visible when held between two fingers at arm's length. The 350,000,000 dipoles could be used to set up jam-free radio communication around the earth. This would be very

useful for U.S. military communications and for Voice of America broadcasts beaming toward Iron-Curtain countries.

Two transmitting and receiving stations have been built by Lincoln Laboratory. One is located at Parks Air Force Base near San Francisco. The other station with its 60-foot precision reflector, shown on the front cover, stands on Millstone Hill in Westford, Mass. These stations, about 3,000 miles apart, will make radar measurements, as well as transmit and receive communications signals for radio propagation measurements. The stations are equipped to attempt simultaneous two-way transmissions.

The dipoles will be pushed back into the atmosphere by solar radiation pressure and burn up in five to seven years. Because of the concern voiced by some scientists, no further dipoles will be sent up until the current experiments have been completely tested and evaluated.

By sending large amounts of dipoles into space (the first load weighed 75 pounds) it might be possible to set up global TV communications. However, this could involve so much material that visual and radio observations would be obscured.

The U.S. Air Force reported that the Midas IV satellite has achieved a nearly circular orbit of about 2,100 miles and takes 172 minutes to travel around the earth. The Midas series, of which Midas II and III are still in orbit, are designed to test telemetry equipment for detection of enemy missiles seconds after they are fired. The so-called West Ford dipole project is not connected with the Midas program. The tiny "satellites" merely hitched a ride on the rocket that carried the Midas into orbit.

• Science News Letter, 80:303 November 4, 1961

TECHNOLOGY

Cooling Capacity Rating

► **MANUFACTURERS** producing more than 85% of the nation's room air conditioners have announced a program to certify the accuracy of cooling capacity ratings in British thermal units.

Although Btu ratings already have been generally adopted to replace the inexact and sometimes misleading "tons" and "horsepower," certification will go one step further to ensure that published data are correct. The program will be effective with 1962 models.

Under the program, sponsored by the National Electrical Manufacturers Association, all models made by a participating manufacturer must be certified. Tests will conform to the NEMA standard, and each certified room air conditioner will bear a seal verifying its rating.

Along with NEMA members, companies that do not belong to the association as well as private brand re-sellers are eligible to participate. Manufacturers who have joined the certification program to date, and whose 1962 models will be certified, are:

Admiral Corp.; Airtemp Division of Chrysler Corp.; Albion Division of McGraw-Edison Co.; Amana Refrigeration, Inc.; Fedders Corp.; Friedrich Refrigerators, Inc.; General Electric Co. (including Hotpoint Division); Gibson Refrigerator Division of Hupp Corp.; Kelvinator Division of American Motors Corp.; Philco Corp.; Remington Corp.; Republic Air Conditioning Co.; Welbilt Corp.; Westinghouse Electric Corporation; and Whirlpool Corp.

Contracts are now being submitted to private brand re-sellers, and their names will be announced later. Other companies may join the program at any time.

Allan E. Bachman, executive vice-president of the National Better Business Bureau, said the certification program will be of great benefit to the consumer.

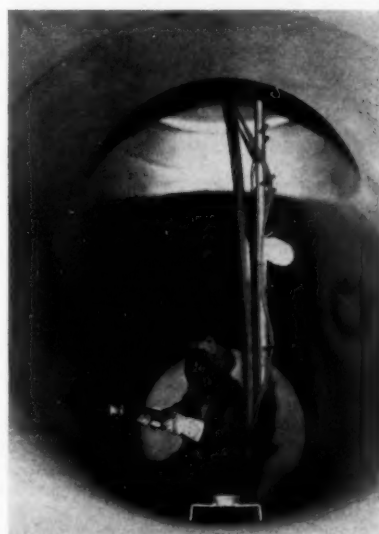
"When cooling capacity was designated in terms of tons," he said, "ratings were inexact. Technically, one ton of cooling means that 12,000 Btu's of heat will be removed in an hour's time. But the terms of the relationship were too broad. Anything from about 8,000 to 12,000 Btu's per hour seemed to qualify for a one-ton designation."

"Horsepower was even more unsatisfactory as a rating since the term simply refers to the output of the electric motor operating the compressor and had no precise meaning in regard to cooling capacity."

"Btu ratings—one Btu is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit—is the only practical way to express cooling performance. But previously when Btu ratings were applied to room air conditioners there was still an area of uncertainty. Were the ratings uniform? More than that, were they believable?"

"Now every 1962 model carrying the NEMA seal will be certified to possess the Btu per hour cooling capacity marked on its nameplate. This will build public confidence in the validity of the ratings."

• Science News Letter, 80:303 November 4, 1961



DRESSING TANK CARS—A shot-blaster from Goodyear Tire & Rubber Co., Akron, Ohio, prepares a railway tank car for installation of a special rubber lining. The bonded rubber linings protect the car shells against corrosive liquids.

MEDICINE

Find Muscular Dystrophy By Body Radiation Count

► **MUSCULAR** dystrophy can be diagnosed using a whole body radiation counter before the patient begins to suffer any symptoms.

This is suggested by scientists of the Los Angeles Veterans Administration Center and the University of California, Los Angeles, Laboratory of Nuclear Medicine who have conducted a study using a sensitive radiation counter that measures radioactivity throughout the whole body.

Scientists have long assigned a major role in muscle activity to potassium. The study was designed to measure potassium levels in muscular dystrophy patients and in their immediate families.

Potassium occurs in the body in three forms, including radioactive potassium-40. Only a small fraction of total body potassium is the radioactive form, but it always remains in the same ratio to the total amount. Thus measurements of potassium-40 reflect total body potassium levels.

It was found that a muscular dystrophy patient had a significantly lower level of potassium than normal and that the level seemed to correlate with the severity of the disease.

It was also found that some brothers, sisters and children of muscular dystrophy patients had low potassium levels, although they seemed healthy. This suggests that there may be a genetic defect in muscle cells leading to potassium depletion and that such a defect may be related to the muscle disorder.

These individuals will be followed to determine whether or not they subsequently develop muscular dystrophy.

• Science News Letter, 80:304 November 4, 1961

OCEANOGRAPHY

World Ocean Research Proposed by the U.S.

► **THE UNITED STATES** has taken the lead in proposing a program for intergovernmental investigation of the world oceans to "increase the contribution of oceanography to the general welfare of mankind."

The U.S. plan, contained in a series of six proposals, was considered by the International Oceanographic Commission of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) meeting in Paris. It would place all oceanographic research under the IOC, including data exchange and committees now operating on a regional basis; an oceanographic forecasting network would be established with specific radio frequencies assigned.

Another proposal recommended that all IOC governments fully participate in the International Indian Ocean Expedition "to the maximum possible extent," including the waiving of all national port entry fees, duty or excise on either equipment or fuel and stores for ships of the Expedition.

The program set up by the United States also provides for exchange of personnel

and equipment for specialized training purposes. It was designed so that "participation of Member States can be planned in terms of their capabilities and interests" without placing an undue burden on any one country. However, the United States, England, France and the Soviet Union, the countries with the largest investment in oceanographic research, probably will finance most of the cost of an international program.

U.S. representatives to the IOC are headed by the Hon. James H. Wakelin Jr., Assistant Secretary of the Navy for Research and Development. Other representatives include Rear Admiral H. Arnold Karo, director of the U.S. Coast and Geodetic Survey; Rear Admiral E. C. Stephan, hydrographer of the Navy; Dr. Donald L. McKernan, director of the U.S. Bureau of Commercial Fisheries; and Dr. Roger Revelle, science adviser of the Department of the Interior.

Dr. Revelle is credited with the establishment of the IOC under UNESCO and has played a major role in preparing the U.S. plan for world-wide cooperation in ocean research.

• Science News Letter, 80:304 November 4, 1961

METALLURGY

Necking Studied But It Is Not What You Think

► **NECKING** is being studied by an engineer at the University of California, Los Angeles—but it has nothing whatsoever to do with teen-age romance.

To Prof. Francis R. Shanley, necking relates to the strength of materials and deals with a problem that has puzzled engineers and metallurgists for a long time.

When a metal bar is pulled from both ends, like a piece of taffy, in a testing machine, it will stretch evenly for a while, Prof. Shanley explains. But at a certain point in the stretching process, a part of the bar will taper down and finally break at the point of smallest diameter. The thinned-down part is called the "neck" by engineers.

Necking is a fundamental problem in the forming of all types of materials, and plays a part in determining the strength of a material in relation to its weight. Recently, this problem has confronted designers of liquid-fuel rockets, who must keep the rockets' tanks to a minimum weight and still retain enough strength to keep the walls of the pressurized tanks from bursting.

Prof. Shanley has developed a complex theory to explain the necking process, the underlying idea being that the testing machine—or nature—finds it easier to produce a neck than to stretch the material uniformly.

Prof. Shanley feels that he has merely opened the door for widespread research on the problem. He suggests further research such as measuring more accurately what happens just before necking starts, varying the materials' rate of stretching and changing the metallurgical composition of materials.

• Science News Letter, 80:304 November 4, 1961

IN SCIENCE

EDUCATION

Married Women Teachers Urged to Stem Shortage

► **MORE MARRIED WOMEN** as teachers is one suggested solution for providing the approximate doubling of the number of instructors needed in the next decade for secondary schools.

The Organization for Economic Cooperation and Development (OECD) meeting in Washington, D.C. agreed the primary obstacle to the needed expansion of education in the OECD countries, which include Western Europe, Canada and the United States, is a serious shortage of teachers.

The only stable solution is a long-term provision for training more teachers, but attracting married women back to teaching is one of the short-term measures suggested. Others are upward revision of salaries, recruitment programs and scholarships for future teachers.

At least a doubling of educational expenditures from all sources will be needed, it is estimated. But the bottleneck is not money but teachers. In the OECD countries in Europe in the next decade there will be 4,050,000 more students in the age 15 to 19 bracket, a 94% increase. These students will need 280,000 more teachers, or a 110% increase.

• Science News Letter, 80:304 November 4, 1961

ASTRONOMY

New Comet May Become Bright as Halley's Comet

► **A NEW COMET**, expected to become as bright as the famed Halley's comet, is now flashing across the skies and approaching the earth.

It can now be seen with the naked eye before sunrise in the constellation Leo, the lion.

The comet was named Seki, after its discoverer, a Japanese amateur astronomer who lives on the island of Shikoku.

Calculations made on the comet's progress by Dr. Leland E. Cunningham of the University of California at Berkeley indicated that the Seki comet will be of almost first magnitude by Nov. 13.

During the second week of November, it will pass by the earth and can be seen very low on the southern horizon. It will then have moved from Leo into the constellation Hydra on its southward journey.

Besides Halley's comet, last seen in 1910 and expected visible again in 1986, two other first magnitude comets, Arend-Roland and Mrkos, were seen in 1957.

Comet Seki was first reported on Oct. 11 at Harvard College Observatory, Cambridge, Mass., clearing house for astronomical information in the Western Hemisphere.

• Science News Letter, 80:304 November 4, 1961

NEW FIELDS

GENERAL SCIENCE

Few Women Choose Science as Career

► **FEW WOMEN** choose science as a career, a report by the National Science Foundation shows.

Although women have been broadening their occupational interests during the last few decades, the traditional fields of teaching and nursing still draw the largest number of women in professional careers. Educational institutions are the leading source of employment for those women who do enter science.

The NSF report, "Women in Scientific Careers," contains available information on the training and employment of women in various scientific fields, as well as an analysis of the factors controlling women's selection of and participation in scientific careers.

The report indicates that although women are becoming an ever larger proportion of the total labor force, science ranks far down on the list of professions that they have thus far entered. For example:

Only about four percent of all federally employed scientists and engineers are women.

About seven percent of a total of more than 166,000 registrants in the National Register of Scientific and Technical Personnel are women. The largest field for women in this register was biology and the next, psychology, each having more than 3,000 women registrants.

Copies of "Women in Scientific Careers" are available from the Superintendent of Documents, U.S. Government Printing Office, for 20 cents.

• Science News Letter, 80:305 November 4, 1961

GENERAL SCIENCE

U.S. Scientific Youth Invited to Japan Fair

► **THE SCIENTIFIC YOUTH** of America is represented at the fifth anniversary of Japan's Student Science Fair by an honor-winning student entomologist from the newest American state which is also the one nearest Japan.

From Hawaii, SCIENCE SERVICE sent to Tokyo via Pan American as its representative, Ronald Sakimura, age 15, and his exhibit. In Japan he is the guest of the National Council for the Advancement of Science and Education and the Yomiuri Shimbun, a leading Tokyo newspaper which sponsors the Japan Student Science Fair.

Ronald is participating in the Japan fair, Nov. 2-7, by showing his project. This is on nematode-trapping fungi—fungi which trap and consume tiny worms which are present in Hawaiian soils. He identified six species, three of which were not found by

leading scientists, and isolated five of the six.

The exhibit was shown in the 12th National Science Fair-International at Kansas City, Mo., last May. It had won one of the two top prizes this year from the Hawaiian Science Fair. The Fair, organized and supported by the Inter-Society Science Education Council of the Hawaiian Academy of Science, had 5,000 exhibits this year.

Although of Japanese ancestry, Ronald was born in Hawaii and has never been to Japan before. His father is an entomologist, while his mother is a secondary school teacher. Ronald now is a junior at the University High School in Honolulu.

Some 20,000 young Japanese scientists are expected to participate in this year's Japan Student Science Fair. More than 60,000 persons are expected to attend.

Japan sends its two top winners to participate in the National Science Fair-International in the United States each year. The winners in the Japanese Fair will come to Seattle next May.

Young scientists from Taiwan, Okinawa and the Philippines also are attending the Japan Fair as observers.

• Science News Letter, 80:305 November 4, 1961

PHYSIOLOGY

Exact Time of Ovulation Studied in Monkeys

► **EXPERIMENTS** with a tiny electric sensor attached to the ovary of a young monkey are expected to reveal the instant in which the egg is released.

This will eventually lead to exact timing of ovulation in humans, it is hoped, and thus throw light on the physiology of reproduction and the problems of infertility.

A total of 75 Rhesus monkeys will be studied. At present only three, at the Bockus Research Institute, University of Pennsylvania Graduate Hospital, Philadelphia, are being studied. The project is under a three-year \$93,826 grant from the U.S. Public Health Service.

The electronic device is surgically attached to the monkey's ovary in preliminary experiments. However, it is planned to construct electronic sensors that can be placed externally on the abdomen, or perhaps inserted within the vagina to check the signals of the internal "broadcasting station" that beeps the instant the ovary releases the egg.

Eventually the investigators hope to develop an external electronic device to check on ovarian activity just as the electrocardiograph checks on cardiac activity.

Dr. Howard Balin, associate in gynecology and obstetrics at the University's Graduate School of Medicine, is the principal investigator. Herbert S. Dordick, an electrical engineer, is co-investigator. Dr. S. Leon Israel, professor and chairman of the department of gynecology and obstetrics, Graduate School of Medicine, and Dr. Vladimir K. Zworykin, president of the Medical Electronic Division of the Rockefeller Institute in New York, are senior associate investigators.

• Science News Letter, 80:305 November 4, 1961

PUBLIC HEALTH

Bottle Test Shows Contaminated Water

► **A SIMPLE** bottle test that anyone can do to determine if a water supply might be contaminated has been devised.

It will show whether trace amounts of detergents and other organic materials are present in a river or well. The detection test was devised by George J. Crits of the Cochrane Division of the Crane Company, Philadelphia.

The presence of detergents or soaps in a water supply may indicate if it is contaminated by leakage from a nearby sewer or cesspool.

The test is performed as follows:

A tall, cylindrical bottle, similar to the type used for olives, is half filled with the water sample and stoppered. When the bottle is shaken, the presence of high amounts of detergents or soap will cause a noticeable foam, but small amounts that may still be objectionable do not cause foam. Instead, a thin film forms and travels upward on the side of the glass bottle. Mr. Crits told the American Chemical Society in New York.

"The film rises until it disappears at a height dependent on the contamination in the water," the engineer said. The greater the contamination, the greater the height of the film or ring. No ring forms with distilled waters or most well waters that are relatively free from contamination. However, with most surface waters and polluted wells, various positive ring values are obtained.

A ring measuring three-eighths to one and one-half inches high indicates the presence of three-tenths to three parts per million of detergent in water.

In addition to checking for pollution of ground waters, the test promises to be very useful to operators in testing the effectiveness of removal of organic materials in settling basins and carbon filters.

• Science News Letter, 80:305 November 4, 1961

EDUCATION

Teacher Shortage Is on the Increase

► **THE SHORTAGE** of teachers, which faces not only the U.S. but Western European and underdeveloped countries as well, will grow more acute in the next ten years.

The shortage occurs particularly in the fields of science and mathematics, John Vaizey of the University of London, reported. He said the reasons for the increasing shortage were threefold:

1. The population increase.
2. The longer time students spend in school.
3. The switch in interest to science.

Although there is a real shortage of teachers, there is no shortage of students, Mr. Vaizey told a conference on economic growth and investment in education in Washington, D.C., under the sponsorship of the Organization for Economic Cooperation and Development (OECD).

• Science News Letter, 80:305 November 4, 1961

PUBLIC HEALTH

Measles on the Way Out

Production of successful vaccines to prevent measles seems assured for 1962. Scientists will meet to discuss controversial questions before approval, Faye Marley reports.

► THE LONG SEARCH for a safe measles vaccine is in sight of its goal—prevention of the disease without side effects.

Production of a successful measles vaccine or vaccines seems assured for 1962. But there are questions to be answered before the U.S. Public Health Service can give the green light to pharmaceutical companies.

Scientists from all over the world will discuss controversial questions at the first International Conference on Measles Immunization called by Surgeon General Luther L. Terry for Nov. 7-9 at the National Institutes of Health, Bethesda, Md. After that, standards for production can be set up.

It looks now as if the family doctor would be giving two shots at one time—vaccine in one arm and gamma globulin in the other—to lessen the side effects of fever and rash that previously have accompanied injections of live weakened measles virus vaccine alone.

This would mean one trip to the physician's office instead of three that would be required if killed vaccine were used such as Buffalo, N.Y., field trials demonstrated.

Goal Is Fewer Shots

Dr. Fred R. McCrumb Jr. of the division of infectious diseases, University of Maryland Department of Medicine, Baltimore, told SCIENCE SERVICE that the troublesome series of visits for shots was precisely what the doctors were trying to get away from.

Dr. McCrumb will present his findings from close to 4,000 simultaneous vaccinations of Maryland children with live vaccine and gamma globulin when the Bethesda meetings is held.

"There is still some work to be done in standardization of dosage," Dr. McCrumb said, "but we believe the combined injections will be the only practical procedure for mass immunization."

Dr. Saul Krugman of the New York University School of Medicine, New York, agrees with Dr. McCrumb and others who have used the combined shots of vaccine and gamma globulin.

Dr. Krugman's studies have involved approximately 1,000 infants and children in the New York City area, 1,000 in West Nigeria and 750 in Israel.

One of the most conclusive field trials was in an epidemic situation in and near Philadelphia. More than 600 children, including 43 in St. Vincent's Home, Philadelphia, and 562 in a residential environment in Haverford Township, Pa., were given gamma globulin at the same time they got measles vaccine.

Dr. Joseph Stokes Jr., physician-in-chief of

the Children's Hospital, and chairman of the department of pediatrics, University of Pennsylvania, Philadelphia, said these tests showed 100% protection from measles in an epidemic recently.

Other tests have been carried out by Dr. C. Henry Kempe, professor and head of the department of pediatrics, University of Colorado Medical Center, Denver, who is in charge of the program for the Bethesda meeting.

Numerous university scientists and pharmaceutical companies have been working on measles vaccines.

The vaccines being developed have all been outgrowths of the initial work done by Dr. John F. Enders, Nobel Prize winner of Harvard University, who was first to definitely isolate the measles virus.

This famous virologist was unable to eliminate side effects of fever and rash when his live weakened vaccine was injected, but in field trials in Massachusetts in 1958, retarded children developed antibodies that have remained high.

The meeting at the National Institutes of Health, which is being sponsored by the Division of Biologics Standards, the National Institute of Allergies and Infectious Diseases and the University of Colorado, will bring out in the open controversies that have grown up as a result of the numerous experiments.

The Public Health Service has held two previous national meetings on measles immunization, but because measles is a worldwide problem, international scientists are being included in this conference.

Measles has wrongly been considered harmless by jokesters who forget the disastrous effect it can have.

Last year the number of deaths from this disease was estimated by the National Office of Vital Statistics as 410 out of 436,000 cases as opposed to 260 deaths from polio, which has been made less widespread by the use of vaccine.

Gamma globulin for years has been injected to lessen the effects both of measles and rubella, German measles, which is an entirely different disease that will not be affected by the new vaccines being discussed for ordinary measles. The virus of rubella has not yet been isolated.

No Measles Ordinary

But no measles is ordinary. Parents and doctors who have watched the effects of this deceptively mild illness, know that it is no joke. Inflammation of the brain (encephalitis) and other complications such as ear infection, otitis media, pneumonia and bronchitis have all too often followed the disease.

Most grown-ups in the United States have had measles, and so far it has been no great problem to get enough gamma globulin, a material in the blood, built up during an attack of the disease. If the two-shot combination of vaccine and gamma globulin is licensed, however, there may be difficulty in getting enough of the globulin. Adults



TWO-SHOT INJECTIONS—Live measles virus vaccine and gamma globulin are given separately to prevent measles and any side effects.

as well as children can get measles, and the Central and South American countries report higher death rates than those of some other countries where nutrition and medical facilities are better.

As recently as World War I, measles was among the communicable diseases that struck American soldiers.

In the sixteenth century the disease was epidemic in England, but it was not until the seventeenth century that Dr. Thomas Sydenham, an English physician, positively distinguished measles from other diseases with puzzling rashes.

Another physician mentioned in medical histories is Dr. Francis Home, a Scottish surgeon, who in 1765 reported mitigating the effects of measles and smallpox. He vaccinated children with material from measles patients and apparently produced some degree of immunity.

But the first known reference to measles in medical literature was in the tenth century by an Arab physician named Rhazes. He wrote a classic work still preserved, which he called a "Treatise on Smallpox and Measles," the first monograph on the subject.

In comparing the two diseases, Rhazes said "inquietude, nausea and anxiety are more frequent in the Measles than in the Smallpox." Ten centuries later, the anxiety may be laid to rest for both.

• Science News Letter, 80:306 November 4, 1961

AGRICULTURE

Soil Bank Senseless in Face of World Food Need

► THE WORLD'S population growth makes restrictions on United States farm production senseless "except as a stop-gap measure," and an inadequate policy for the 1960's, George McGovern, the director of the Food for Peace program, said at New London, N. H.

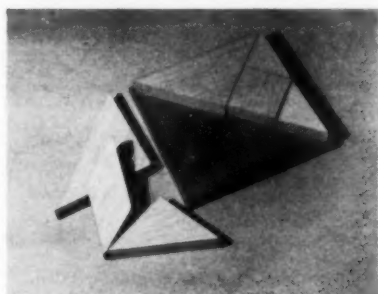
Instead of placing unused farmland in a soil bank, he urged that the U. S. do more to gear farm output to world needs, producing "more milk, more soybeans, more poultry meat, more rice, more fats and oils."

He said the U. S. should teach underdeveloped countries how to farm more efficiently, call upon private industry to help these countries develop better food handling and processing methods, and give our field technicians a better working knowledge of nutritional problems.

Mr. McGovern, speaking at the Food and Nutrition Conference at Colby Junior College, said future historians probably will be puzzled because so many Americans regarded their agricultural abundance as "a national headache" during the past decade.

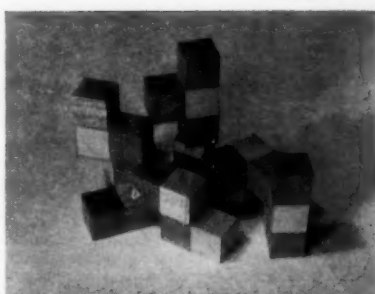
Soviet Premier Khrushchev, he said, is keenly aware of "food production as a high priority goal," and has reserved his sternest lectures for farmers with poor records. Mr. McGovern pointed out that the American farmer now produces enough to feed himself and 25 others, while the Soviet farmer is barely able to feed himself and four others.

• Science News Letter, 80:307 November 4, 1961



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Books of the Week

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

AMERICA'S FIRST WOMAN CHEMIST: Ellen Richards—Esther M. Douty—*Messner*, 191 p., \$2.95. Juvenile biography.

ARCHAEOLOGY IN THE USSR—A. L. Mongait, transl. from Russian and adapted by M. W. Thompson—*Penguin*, 320 p., illus., paper, \$1.45. Intended as a popular scientific outline of the achievements of Soviet archaeologists.

BIRDS OF THE WORLD—Oliver L. Austin, Jr.—*Golden Press*, 320 p., 11" x 14", illus. by Arthur Singer, \$14.95. Ornithologist's survey of the 27 orders and 150 families, with more than 300 paintings and maps in full color.

A BOOK OF CURVES—E. H. Lockwood—*Cambridge*, 200 p., illus., \$4.95. Describes methods of drawing plane curves, from parabola to bipolar coordinates.

THE CHALLENGE OF THE ATMOSPHERE—O. G. Sutton—*Harper*, 227 p., diagrams, \$5.95. Explains meteorology as an analytic and deductive science that challenges the meteorologist to extract some measure of rule from the turbulent atmosphere in his attempt to explain and predict its behavior.

CHECK LIST OF PLANT AND SOIL NEMATODES: A Nomenclature Compilation—Armen C. Targan—*Univ. of Fla. Press*, 200 p., \$7.50. A guide to nomenclature as well as to the pertinent literature.

CHEMICAL PROCESSING OF REACTOR FUELS—John F. Flagg—*Academic Press*, 530 p., illus., \$17.50. Textbook and reference work for engineers and research workers.

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RADIOSTRONTIUM AND RADIOCESIUM IN DRINKING WATER IN THE UNITED KINGDOM, RESULTS TO DECEMBER, 1960—R. N. Crooks, R. G. D. Osmond and T. J. Webber—*AERA (Brit. Inform. Serv.)*, 18 p., paper, 60¢. Results of measurement and analysis of radioactivity in British water supplies, 1957-1960.

SCIENCE AND MUSIC—Sir James Jeans—*Cambridge*, 258 p., illus., paper, \$1.95. First paperback reprint of 1937 edition.

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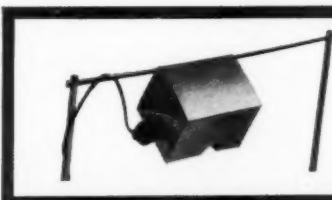
• Science News Letter, 80:308 November 4, 1961

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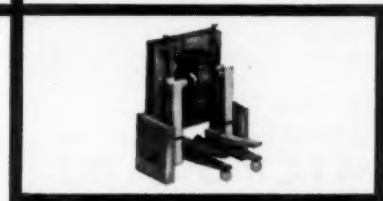
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INVENTION

Patents of the Week

► **A LIGHT AMPLIFIER** that preserves the color distribution of the original image, a system that has military applications for enemy detecting devices, has been granted a patent.

Radames K. H. Gebel of Dayton, Ohio, assigned rights of patent No. 3,005,108 to the U.S. Air Force for its use without payment of royalties. The light amplifier, he said, allows examination of the distribution of individual primary colors in an image and examination of the light content both in the visible and infrared regions.

It is made of narrow strips of electroluminescent materials, which give off light when subjected to an electric current. Alternating voltages are applied to the strips, the amount of voltage being controlled by photoconductors subjected to the light of the image to be amplified.

Color in the amplified image may be produced by having the electroluminescent materials produce the primary colors directly.

Light amplifiers such as the one patented by Mr. Gebel can be used in combination with optical systems of high light-gathering ability for making observations at light levels below that which the human eye can see and at wavelengths to which the eye is insensitive.

For military use, observations of the same scene made in full color can be compared with observations made in the individual primary colors, as well as those in the infrared compared to the visible portion. In large scale, Mr. Gebel said, the device could be used to amplify projected television images.

L. C. Miller of Macedonia, Ohio, won patent No. 3,004,391 for a combined floating boat dock and walk. The dock floats at one end on the water and is connected to the shore at the other end, permitting limited movement in response to waves and tides.

This system, Mr. Miller claims, presents little or no danger of damage even in high winds. The floating dock can also be readily removed for maintenance, repair, cleaning and storage.

Truck drivers towing large semi-trailers that are attached to the cab portion by a kingpin can reduce the chances of high-jacking when the trailer is disconnected by using a device patented by William Bowler of St. Laurent, Quebec, Canada. He assigned rights of patent No. 3,004,421 to the Canadian National Railway Company, Montreal.

The device consists of a collar with a lock that fits on the kingpin of the semi-trailer so that the kingpin cannot be used to hitch the trailer to the coupling of the highjacking cab. When the collar is used on a semi-trailer, the highjackers must either remove the collar by cutting through it or provide other means for moving the trailer. Either of these operations is lengthy and greatly increases the chances of being caught, Mr. Bowler claims.

Joyce Semoneit of South Amboy, N.J., has come to the aid of music students learning to finger stringed instruments with a device to help them learn where to place their fingers to produce the desired sound, thus reducing instruction time. She was awarded patent No. 3,004,461 for the device, which consists of movable indicators, each preferably having a color spot, that show the position to be fingered on each string to produce a given tone.

• Science News Letter, 80:310 November 4, 1961

MEDICINE

Cancer Starts When Cells Suffocate

► **CANCER GETS ITS START** when the individual cell starts to suffocate, evidence presented to the First International Pharmacology Meeting in Stockholm indicates.

The first test in a living animal of the idea that cancer is due to the lack of oxygen was made with mice, Dr. George T. Okita of the University of Chicago reported.

With Dr. Esmat A. Ezz, Dr. Okita experimented on mice that nearly always get mammary cancer from the mother's milk, which carries a cancer-inducing virus. At the age of one year, nearly all the young either have mammary tumors or are in a pre-tumorous state.

When some of these mice were delivered by Caesarean section, kept tumor-free by being segregated from their mothers and injected with radioactive food chemicals that are immediately burned in the cells, they were found to burn their food by the normal method. The tumor-bearing mice, however, burned their food by a more primitive or "glycolytic" method that requires less oxygen.

The food-burning method was measured by collecting the radioactive carbon dioxide exhaled by the mice.

Measurements on the one-year-old, pre-cancerous mice fell somewhere in between the measurements on the healthy and the tumorous mice. But even though there were no visible signs of cancer on the one-year olds, they were definitely headed in a cancerous direction.

• Science News Letter, 80:310 November 4, 1961

Questions

PUBLIC HEALTH—How many cases of food-borne and water-borne diseases were reported in the 10-year period ending in 1960? p. 302.

SPACE—How many feet will there be between dipoles when scattered in space? p. 303.

Photographs: Cover, Lincoln Laboratory; p. 299, Picker X-Ray Corporation; p. 301, Harvard University; p. 303, Goodyear Tire & Rubber Company; p. 306, Merck, Sharp and Dohme; p. 312, Rosanna.



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❁ **BATTERY TERMINAL PULLER** is a pocket-size, C-shaped band of steel, with a screw inserted opposite the open end. The tool will remove corroded terminals from a battery easily and without damage. To loosen the terminal, the open part of the device is slid under the terminal, the screw turned down onto the terminal post and an extra turn given with a wrench.

• Science News Letter, 80:312 November 4, 1961

❁ **SCIENCE TEACHING AIDS** for science classes have classroom-tested lectures and complete instructions with as many as six major components included in each apparatus set. Priced to meet school budgets, there are kits on solar radiation, electronics, theory of gravity, optics and other physical laws.

• Science News Letter, 80:312 November 4, 1961

❁ **REFLECTING MICROSCOPE** lets the student view microscopic specimen slides with both eyes. The image from the 50- and 100-power microscope with built-in lighting is projected onto an illuminated screen. Two slides are included with the set.

• Science News Letter, 80:312 November 4, 1961

❁ **DRAW-STRING LUNCH BAG** of quilted plastic replaces paper lunch bag. The insulated bag, shown in the photograph, is weatherproof, leakproof and washable. Available in five colors, the bag has



many other uses, such as a beach bag, ho-ho bag, litter bag, or for carrying rubbers.

• Science News Letter, 80:312 November 4, 1961

❁ **VACUUM TWEezer** to pick up miniature objects replaces mechanical tweezers for engineers, jewelers and hobbyists. Connected to a small vacuum generator operating on 110 volts, the aluminum tweezer is

used with stainless steel pick-up needles of various sizes. The vacuum is controlled by covering an opening in the tweezer body with the finger, the object being held without damage until released.

• Science News Letter, 80:312 November 4, 1961

❁ **ZEROZERO CENTER FINDER**, useful in home workshops, for engravers and tool and die men, finds exact centers in seconds. Made of clear plastic, it has no moving parts and requires no calculations to operate. The device will find centers for rounds, squares and octagons up to eight inches and for hexagons up to 5 1/4 inches.

• Science News Letter, 80:312 November 4, 1961

❁ **MULTIPURPOSE INK MARKERS** in five colors contain waterproof ink that dries instantaneously and is permanent except on china and glass. Sealed in plastic vials with tight-fitting caps, the ink feeds continuously through felt "wedge cut" tips for thick and thin-line writing.

• Science News Letter, 80:312 November 4, 1961

❁ **HIGHWAY WARNING LIGHT** is a battery-powered flasher with a transistorized circuit for high light brilliance and low battery usage. The seven-inch plastic amber-colored lens, impact and weather resistant, forms one piece with the steel-enclosed battery case. The flasher is also useful on outdoor construction projects.

• Science News Letter, 80:312 November 4, 1961



Nature Ramblings



Do You Know?

► **NOVEMBER** is known as the "Snow Month" and the "Month of the First Frost." It is also the month in which the dense blackish-brown fur of the beaver is at its prime. For this reason the full moon of November is occasionally referred to as the "Beaver Moon."

The animal for which a moon is named is the largest North American rodent. The usual weight of the flat-tailed beaver is 40 to 50 pounds, although 70 pounds is no exception.

The range of this animal is throughout the greater part of the continent. It is likely to be most abundant where aspens and cottonwoods grow. Although these are preferred foods, the beaver also eats the bark of many other trees including alders, birches, and willows.

All autumn long the beaver is unusually active. It puts in extra hours gathering a winter food supply and mending its dam and lodge. The supply of food is anchored in deep water, well below ice level and within easy swimming distance of the lodge.

A cone-shaped affair, the lodge consists

Beaver



of one large room, with a diameter as much as six feet and a three-foot ceiling. This all-purpose room is usually occupied by a family of six—a male and a female and two litters of young.

Whenever a member of a beaver family is hungry, it leaves the lodge by an exit known as the plunge hole, swimming under the ice to the log pile. The beaver selects a log and returns with its log meal. Before entering the chamber, a beaver shakes itself free of water. It eats all the bark from the log in a corn-on-the-cob fashion. The stripped log is tossed into the plunge hole.

• Science News Letter, 80:312 November 4, 1961

Too few calories plus too little iron in the diet are possible causes of moderate anemia found to be widespread among Eskimos in western Alaska.

The U. S. produces about 75% of the world's total fruit and vegetable juice supply.

To protect the 30,000,000 acres of alfalfa plantings in the U. S. against destructive wilt disease devastating alfalfa in Europe, all imported alfalfa seed is now required to have fungicidal treatment before entry.

Heart weights of many birds vary with the season, being larger in winter than in summer.

The glass most used today in research industry is borosilicate glass.

One-third of all cancers at all sites and all stages are now amenable to cure or long-term survival.

• Science News Letter, 80:312 November 4, 1961

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